Notice of Allowability	Application No.	Applicant(s)	
	10/711,089	TRAN, NHAN	
	Examiner	Art Unit	
	Jennifer L. Norton	2121	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *Interview Summary, 24 & 25 May 2006*.

2. ☒ The allowed claim(s) is/are *1,2 and 4*.

3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☐ All b) ☐ Some* c) ☐ None of the:
      1. ☐ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☒ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

5. ☒ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☒ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☒ Interview Summary (PTO-413), Paper No./Mail Date _____ .
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

DETAILED ACTION

1. The following is a Notice of Allowability is in response to the Examiner's Amendment per telephonic interview with Nhan Tran on 24 & 25 May 2006. Claims 1-2 and 4 have been amended. Claims 3 and 5 have been cancelled. Claims 1-2 and 4 remain pending in this application.

Claim Objections

2. The objections to claims 1-2 and 4-5 have been withdrawn.

Oath/Declaration

3. Per the telephonic interview on 24 May 2006 with applicant Nhan Tran, applicant stated a new oath would be submitted to the Office. The objection to the oath/declaration stands.

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Nhan Tran on 24 May 2006.

2. The application has been amended as follows. Note: Corrections to have been underlined (example) and deletions have been placed in brackets ([example]):

Specification

3. The following paragraphs of the specification should be replaced, respectively:

Paragraph [0013] should be replaced with:

[0013] Fig. 3 shows the block diagram of the OCCS circuit consisting of: 12 [1]_The 24VDC unregulated power supply that energizes the relay and the 5VDC supply; 13 [2]_The regulated 5VDC power supply that provides power for electronic components; 14 [3]_The PIR sensor; 15 [4]_The PIR amplifier with band-pass filter; 16 [5]_The photocell sensor circuit; 17 [6]_The microprocessor chip; 18 [7]_The relay to drive electrical load; 80 [8]_The seven-segment LED display; 19 [9]_The electrical load; 20 [10]_The OnOff/Sleep soft touch push button; 21 [11]_The Counter Up/Down soft touch push button.

Paragraph [0015] should be replaced with:

[0015] Fig. 5A shows the PIR sensor being encapsulated in a cylinder tube to narrow its detection angle. The figure consists of: 22 [1]_the restrict-vision tube; 23 [2]_the PIR sensor body; 24 [3]_the Exit element sensor; 25 [4]_the Enter element sensor.

Paragraph [0016] should be replaced with:

[0016] Fig. 5B shows the defined vision angle of the vision restricted PIR sensor. The figure consists of: 74 [1]_the restrict-vision tube length Y; 24 [3]_the Exit element sensor; 25 [4]_the Enter element sensor; 26 [5]_the vision angle Alpha that is defined as Tan(alpha) = X / Y. Where Y is the length of the restrict-vision tube and X is the radius of the tube plus 1mm. Length Y is proportional to the PIR signal gain.

Paragraph [0019] should be replaced with:

[0019] Fig. 8 shows the Vision-Restricted PIR Sensor mounted on the pivot-join supporter. The figure consists of: 75 [1]_the restricting PIR sensor vision tube; 76 [2]_the encapsulated PIR sensor; 77 [3]_the PIR signal wires; 78 [4]_the Pivot-join supporter; 79 [5]_the Cover Plate. The restricting vision tube and the PIR sensor as a whole can swing 180 degree on the Pivot-join supporter. The Pivot-join supporter is connected perpendicular to the Cover Plate and can be rotated around its axis but limited to 360 degree to prevent the PIR signal wires from excessively twisting.

Paragraph [0020] should be replaced with:

[0020] As shown in the Fig. 3, the present invention Occupant Counter Control Switch, OCCS for short, is provided with a PIR motion sensor 14 [3] to detect heat, infrared energy, from human body moving across the sensor. The PIR sensor is powered by a regulated 5VDC 13 [2], which is supplied by an unregulated 24VDC 12 [1]. The signal of the PIR sensor is, unique to each of the two directions of a person entering or exiting

the room (see Fig. 4), amplified and filtered by U2 with the RC combinational network R10, R11, C5, C6, and C7 shown in the Fig 6. U2 is bias at 2.5VDC and is in current amplification mode. The amplified PIR signal is then fed to the A/D, analog to digital converter, of the microprocessor U4 in Fig. 6 for further process for counting and thereby controlling the relay to drive electrical appliances. The embedded program, based on the algorithm shown in Fig. 7 that will be clarified later, directs the microprocessor from receiving and analyzing inputs to appropriately timing and logically sequencing to ensure the proper arranging and selecting of events that lead to the right outcome among the outputs. The microprocessor provides seven outputs to drive seven LED segments of the digital display 80 [8] (see Fig. 3 and Fig. 6). Each segment of the digital display is blinked at a time and the embedded program controls the sequence of blinking rapidly such that the display of the entire digit appears solidly illuminated. The Photo sensor circuit 16 [5] (see Fig. 3), also powered by 5VDC, feeds its signal to another A/D input of the microprocessor to prevent the relay from closing if adequate ambient light is detected. The relay 18 [7], driven by an operational amplifier that powered by 24VDC, receives command from the microprocessor to turn on or off the electrical load. The push button 20 [10], tied to an input of the microprocessor, serves as a manual on off toggle switch when it is released after being pressed and held in shorter than half a second, and serves to activate sleep mode when it is released after being pressed and held in longer than half a second. The push button 20 [10] also servers as a manual single count up from zero to one upon it is released after

being pressed and held in less than half a second when the count or the shown display is at zero; this is a convenient feature that allows the user to turn on the lights by pressing any of the buttons when the count is at zero. The push button 21 [11], tied to another input of the microprocessor, is for manually adjusting counting up or down. The counter counts up when the button 21 [11] is released after being pressed and held in longer than half a second. The counter counts down when the button 21 [11] is released after being pressed and held in less than half a second. The push buttons are assembled with the overlaid rectangular plastic pieces whose areas are big enough to allow easily getting pressed (see Fig. 2A).

Paragraph [0021] should be replaced with:

[0021] When the two buttons together are pressed and released, the system enters into adjusting mode and the display shows a letter "A" to mean adjusting. The letter "A" will soon change into a digit, the level, of adjusting when one of the buttons is pressed. There are nine levels in each adjusting mode. In PIR sensor adjusting mode, the push button 20 [10] is for increasing or decreasing the sensitivity of the PIR sensor to extend or reduce the detection range respectively. To decrease the sensitivity, the button 20 [10] must be pressed and held in longer than half a second. To increase the sensitivity, the button 20 [10] must be pressed and held in shorter than half a second. In lighting demand adjusting mode, the push button 21 [11] is for changing the photo sensor reference, that is called the lighting demand level, which is compared with the photo

sensor digitized voltage. When released after being pressed and held in longer than half a second, the button 21 [11] increases the lighting demand level. If the lighting demand level is adjusted higher than that of the current ambient light and the count is greater than zero and the said relay has not been manually turned off, the lights is allowed to automatically turn on. To decrease the lighting demand level, the button 21 [11] is pressed and held in less than half a second. If no more pressing on any button for about one minute or the two buttons are pressed and released together, the system will get out of the adjusting mode and resume its normal operation.

Paragraph [0022] should be replaced with:

[0022] Shown in the Fig. 7 is the control algorithm of the embedded program that directs the said microprocessor to perform its functions. After power up, the microprocessor initializes all values of variables and constants and then stays within the main loop starting at block 27 [1]. The microprocessor reads the status of the PIR sensor block 28 [2] and quickly blinks a segment of the displayed digit zero block 29 [3]. If the PIR sensor detects a person entering the room, its amplified signal rises above the bias level 2.5V denoted as U-pulse (upper pulse) in block 30 [4]. As the person continues passing through the PIR sensor, his/her body infrared energy strikes the other sensor element that causes the signal falling, resulting from the negative charge of the latter element, below 2.5V denoted as L-pulse (lower pulse) in block 34 [8] (also see Fig. 4A). In the case if noise affects the PIR sensor and causes the

U-pulse to occur without the immediate following of the L-pulse block 34 [8], the program loops back to start a new cycle at block 27 [1]. Noise is usually caused by a person walks near by the sensor. Now if the presence of the L-pulse 34 [8] after the U-pulse 30 [4], counting up takes place block 39 [11] and the microprocessor also quickly blinks another segment of the display. The count now is greater than zero and the program reads the photo sensor status 42 [16] and also quickly blinks another segment of the display block 43 [17]. If the photo sensor detects insufficient ambient light 44 [18], then logically the lights or lamps should be turned on, which is true in 47 [21] if the relay was not manually turned off in 46 [20]. If the relay was manually turned off in block 46 [20], the lights are not allowed to be on via block 40 [14]; another segment is also blinked at this point. On other hand, if enough ambient light is detected in 44 [18], then logically the lights should not be on, which is true in block 40 [14] if the relay was not manually turned on in 45 [19]. However, if the relay was manually turned on in 45 [19], the lights must be on by block 47 [21]. Another segment of the display is also blinked and the program loops back to start 27 [1] for a new cycle. A similar logic is applied for detecting a person exiting the room, which is when the L-pulse 31 [5] occurs first and the U-pulse 35 [9] immediately follows (also see Fig. 4B). The residue pulses shown in Fig. 4A and 4B are ignored as noises. The counter now is counting down in block 38 [12] and following is another blink of the segment. If the count reaches zero in block 41 [15], the lights are immediately turned off by block 40 [14] and the program starts another new cycle. If the count is still

greater than zero, the outcome of the lights is dependent on the combination of ambient light and manual control the relay via the On/off toggle push button just as described above.

Paragraph [0023] should be replaced with:

[0023] If no activities from the PIR sensor after start of a cycle, the program checks the count push button, Cnt-Swt in block 32 [6]. If the count button is pushed and held in longer than half a second in block 36 [10], the counter counts up in block 37 [11] as the count button is released and another segment of the display is also blinked. The counter now is greater than zero and the program follows the same path from block 42 [16] as described above to determine the outcome of the lights. The counter counts down in 38 [12] if the count button is released after held in shorter than half a second. The count value is then checked in 41 [15] to determine the status of the lights on or off by following the same path of blocks 40 [14] or 42 [16] just as described above. If no activities from the count button in block 32 [6], the program goes on to check the status of the On/off-Swt push button in block 33 [7]. If the button is released after pushed and held in less than half a second in block 49 [23], the relay is energized in 47 [21] to turn on the lights if the relay has not been energized before in block 48 [22]. If the relay has been energized in block 48 [22], the lights are turned off via block 40 [14] of de-energizing the relay. Thus, when the On/off button in block 33 [7] is pushed and held in less than half a second, it serves as a toggle switch to turn the lights on or off.

On other hand, if the same button in 33 [7] is held in longer than half a second, the program triggers the sleep mode and displays the letter "L" in 50 [24]. Letter "L" stands for "sleep". The sleep mode is a timer interrupt mechanism that keeps the lights on a certain period of time, preset about three minutes, to allow the user getting prepare before getting into the bed. The interrupt mechanism causes the program frequently interrupts what it is doing to check on the timer in block 51 [25] and then returns to where it interrupted to continue its routine. When the timer expires in block 51 [25], the lights are automatically switched off by block 69 [44] to let the user sleeps. The sleep mode is either deactivated in block 66 [40] by the On/off button in block 65 [39] is pressed and held in less than half a second or by the count reaches zero in block 70 [45] as the last person exits the room.

Paragraph [0024] should be replaced with:

[0024] If the program finds no activities of the On/off button in block 33 [7], it moves on to check the Sleep Mode in block 68 [42]. If the Sleep Mode is active, the lights have been off, the program checks on the On/off button again in block 65 [39] and continues on as described above. If the Sleep Mode is not active in 68 [42], the program checks on both buttons, the On/off-Swt and the Cnt-Swt, in block 52 [26]. If they both together are pressed, the program steers into adjusting mode and builds and blinks a segment of the letter "A" in 53 [27] to indicate the system is in adjusting mode. Each segment of the letter "A" is rapidly blinked in 67 [41] until the two buttons are

released. The letter "A" will soon change into a digit that reflects the level of adjustment as one of the buttons is pressed. As the two buttons are released in 64 [38], the adjusting mode timing is set and is checked in 54 [28]. If no more activities of the two buttons are detected until the adjusting mode time out, about one minute, in 54 [28], or the two buttons together are pressed again in 55 [29] before adjusting mode time out, the program will get out of the adjusting mode and restart a new cycle. Once in the adjusting mode, before adjusting mode time out, if the On/ off button in 56 [30] is pressed and released after held in longer than half a second in 59 [33], the photo sensor reference is increased. There are nine levels of adjustment for the photo sensor reference. A segment of the digit, the level, of adjustment is blinked and a constant PTOconst is multiplied with this adjusted level in 60 [34] to form a photo sensor reference product that will be compared with the ambient light level in the block 44 [18]. The ambient light level is the voltage from the divider network formed by the photo sensor Pcell and R12 in the Fig. 6. This voltage is digitized into counts and is compared with the photo sensor reference. The photo sensor reference is also called the lighting demand level. If the lighting demand level is higher than the level of the current ambient light in the room, the lights are allowed to automatically turn on after a change in count, that means when there is a person entering or exiting the room. Once the lights are on, the photo sensor is disabled to prevent the on and off oscillation of the lights. If the On/off button is pressed in 56 [30] and released after held in less than half a second in 59 [33], the photo sensor reference or the lighting demand level is de-

creased in 61 [35] and the program prevents the lights from automatically turning on if the lighting demand level is lower than the level of ambient light. Like the process in 60 [34], constant multiplication and blinking a digital segment take place in 61 [35].

Paragraph [0025] should be replaced with:

[0025] If the program detects the count, Cnt-Swt, button is pressed in 57 [31] while in the adjusting mode, the PIR noise immunity is adjusted. There are also nine levels of adjustment of the PIR noise immunity. When the count button is pressed and held in longer than half a second in 58 [32], the PIR noise immunity is increased in 62 [36]. The noise immunity level is multiplied with the PIRconst constant to form a product that determines the signal sensitivity of the PIR sensor. A segment of the digit of the noise immunity level is also blinked in 62 [36]. If the count button is held in less than half a second in 58 [32], the PIR noise immunity is decreased in 63 [37] and the same process of constant multiplication and blink a segment also takes place. The PIR noise immunity is helpful in setting the detection range of the PIR. The lower the noise immunity level, the farther the detection range is, and vise versa. If no activity of the two push buttons is detected, the program keeps blinking sequentially each segment of the digital display in block 71 [46] until the adjusting mode timer in 54 [28] expires. After the processing 60 [34] or 61 [35] or 62 [36] or 63 [37], the program checks the adjusting mode timing 54 [28]. If the time is up, the program jumps out of the adjusting mode and restarts a new cycle. The adjusting mode timing will be set for one

minute. The user can also terminate the adjusting mode by pressing both buttons together as mentioned in the block 55 [29].

Claims

4. The claims have been amended as follows, and replace all previous claims:

Claim 1. A smart switch system called Occupant Counter Control[t] Switch, or OCCS, automatically turning on and off electrical appliances by intelligently keeping track of and displaying the number of occupants in a room via the process of counting up or counting down when detecting a person entering or leaving the room respectively (see Fig. 1), the said OCCS comprises of:

a Vision-Restricted PIR Motion Detector for generating two distinctive signals that correspond to the two different directions of a person entering or exiting the room (see Fig. 5 and Fig. 4);

a removable dome shape clear plastic or Fresnel lens for covering and protecting the said Vision-Restricted PIR Motion Detector from accidentally getting contacted and changed its pre-aimed direction (see Fig. 2);

a photo sensor for detecting ambient light (see Fig. 3 or Fig. f);

a digital display controlled by [the embedded] a program that sequentially and rapidly flashes each segment at a time for displaying the figure of the count value that indicating number of occupants in the room, or displaying [the] a scale value of tuning

processes, or displaying a letter "L" indicating the system is in sleep mode, or a letter "A" indicating the system is in adjusting mode (see Fig. 2);

two soft touch push buttons for manually controlling [the] a relay, driving the electrical load, and for serving other functions (see Fig. 2);

wherein said the two push buttons controlled by the said [embedded] program makes up nine combinational function keys:

an adjusting count up key when [the] a Up/Down Counter button is pressed and held in longer than half of a second, an adjusting count down key when the Up/Down Counter button is pressed and held in shorter than half of a second, a manually toggling on key to close the said relay to turn on the lights when [the] a OnOff/Sleep button is pressed and held in less than half of a second while the lights have been off, a manually toggling off key to open the said relay to turn off the lights when the OnOff/Sleep button is pressed and held in less than half of a second while the lights have been on, an activating sleep mode key when the OnOff/Sleep button is pressed and held in longer than half of a second, when the two buttons are pressed and then released together the first time allowing accessing to other four remaining function keys, typically [the] a key to increase the noise immunity of the said PIR signal when the Up/Down Counter button is pressed and held in more than half of a second, [the] a key to decrease the noise immunity of the said PIR signal when the Up/Down Counter button is pressed and held in less than

half of a second, [the] a key to raise the light demanding level when the OnOff/Sleep button is pressed and held in longer than half of a second, [the] a key to lower the light demanding level when the OnOff/Sleep button is pressed and held in shorter than half of a second, finally the two buttons are pressed and released together the second time, or no further pressing on any button for one minute, the adjusting mode is terminated and the system resumes its normal operation;

an amplifier circuit with band-pass filter for filtering 60 to 120 Hz noises and amplifying the signal of the said PIR sensor (see Fig. 6);

a delicate and complicated program embedded in a microprocessor IC chip as a central processing of all inputs and outputs of the said smart switch.

Claim 2. The OCCS or smart switch as claimed in claim 1, wherein said the Vision-Restricted PIR Motion Detector is further comprises of:

a cylinder tube encapsulates a dual-element PIR sensor to form a vision-restricted sensor for narrowing the detection angle of the said PIR sensor (see Fig. 5A); a pivot-join supporter allows the said Vision-Restricted PIR Motion Detector to be adjusted to point at any direction (see Fig. 8) so that the OCCS can be mounted at the right side or left side of the entrance of [the] a room or can be aimed down to detect children.

Clam 3. (Cancelled)

Claim 4. The OCCS or smart switch as claimed in claim 1, wherein said the micro-processor is an IC chip that comprises of an output tied to a relay or a triac to drive electrical appliances, other seven outputs to drive seven LED segments of the said digital display, two analog to digital converter inputs to digitize [the] an amplified signal of the said PIR sensor for counting process and to digitize the signal of the ambient light from the said photo sensor for co-controlling the said relay, and the other two inputs tied to the said two push buttons (see Fig. 3 or Fig. 6).

Claim 5. (Cancelled)

Drawings

5. The following changes to the drawings have been approved by the examiner and agreed upon by applicant: See Amended Drawings, Figs. 3, 5A, 5B, 7, and 8 by the Examiner. The corrected reference characters (i.e. numbers) have been circled. In order to avoid abandonment of the application, applicant must make these above agreed upon drawing changes.

Reasons for Allowance

6. The following is an examiner's statement of reasons for allowance: The combination of elements found in Claims 1 and 3 are not found in the prior art.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The following references are cited to further show the state of the art with respect to an electronic switch.

U.S. Patent Publication No. 2005/0236906 discloses an electronic switch for a light with a Frensal lens.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer L. Norton whose telephone number is 571-272-3694. The examiner can normally be reached on 8:00 a.m. - 4:30 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Anthony Knight can be reached on 571-272-3687. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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